

the Practical Farmer

Practical Farmers of Iowa newsletter

Vol. 1, #4
Fall, 1986

PFI WINTER MEETING MONDAY, DECEMBER 15

Registration materials have already been mailed for the Monday, December 15 meeting of Practical Farmers of Iowa. The location will be the Starlite Village, just off the 13th St exit of I-35, in Ames. Members pay only for the meal, but please register ahead. See the mailing for details.

There has been a fair amount of press attention to the meeting already, thanks to the publicity work of Ron and Maria Rosmann and due to the timely topic. The theme is "Iowa's Water Problem." Farm groups, PFI included, have presented speakers on the subject before. However, this session will be the first to attempt an examination of the situation in its entirety.

Dr. George Hallberg, Chief of the Geological Studies Division of the Iowa Geological Survey, will report the latest findings on pesticides in Iowa's ground water. As you may know, the Ia. Geological Survey was the first to break the news of the problem in northeast Iowa. The organization is now monitoring wells across the state.

Dr. Leon Burmeister is a professor of biostatistics in the

U. of I.'s College of Medicine. He conducts what are called epidemiological studies, looking at recurrent health problems in the population and statistically linking them with possible causes in the environment. His talk is entitled: "Which Farming Practices Might Be Associated With Cancer?"

Dr. Richard Fawcett, Extension Weed Specialist at I.S.U., will then describe ways that farmers can limit their use of herbicides and which of these chemicals are least likely to persist and move into ground water.

Dick and Sharon Thompson, PFI farmers from Boone County, will wrap up the workshop with "A Farmer's Approach to Clean Water." Having encountered the typical situations and problems related to drinking water and to pesticides, they have a practical perspective to share.

The day will end with a short business meeting to bring members up to date and to make a few decisions. For one thing, members from northeast Iowa (District #3) need to choose a new representative to the board of directors.

Let's hope the roads are clear that day!

ON-FARM RESEARCH/DEMONSTRATION

As reported in the last issue of The Practical Farmer, the board is seeking to hire a full-time coordinator. A major responsibility of the position would be setting up a series of research/demonstration sites on farms of PFI members. Plans call for ten such farms -- two per district -- to be established initially.

Negotiations are still under way to secure the grants that would make this possible. However, the board may interview a candidate for the position on December 15.

PFI expects to be able to provide a good deal of support to those participating in the project. The PFI coordinator will work with these members to ensure that experiments are both well-designed and farmable. There will be the option to bring in university scientists and student summer interns for some technical and field work. A weigh wagon, which will be shared among the farms, will facilitate collection of harvest data. Communication with the public will be an important component of the project. Field days will be organized and advertised.

In meetings and conversations Practical Farmers members have shown a knack for innovation and experimentation. This is a chance for some members to really help get alternative farming practices on the map. If you think you might want to participate, contact your district board member.

ABOUT THE BEEF QUESTIONNAIRE

Earlier this year a fellow named Bob Steffen approached PFI board members about an organic beef survey he was taking in Nebraska and surrounding states. He and others are attempting to match up the supply of organically produced beef with the demand in stores.

PFI was invited to participate in the study.

Steffens' initial results suggest that small- and medium-sized producers are the ones most interested in raising organic or natural beef at this point. Most of those responding to the questionnaire were willing to consider a moderate expansion of their operation. Almost all of the respondents were interested in working with a larger group to develop markets for this kind of beef.

Steffen is now questioning consumers in order to quantify the demand for organic and natural beef. There is indeed demand. The problem is that a grocery chain could need a volume of beef larger than several counties of producers could supply.

In presenting a beef questionnaire to PFI members, we do not want to raise expectations. There is not now any large-scale marketing organization geared to small- and medium-sized producers of this specialty beef. However, if this kind of marketing is ever going to develop, surveys like this one must be carried out to lay the groundwork.

Because PFI is not a group of only organic farmers, and because consumer demand emphasizes "lean" and "chemical-free," these categories were included in the version of the questionnaire enclosed in this newsletter. Returned surveys will be forwarded to board member Ron Rosmann, who, with his wife Maria, raises cattle near Harlan. Ron will tabulate and analyze the results, which will be published in The Practical Farmer. Names of those responding to the survey will remain confidential and on file. If and when marketing opportunities develop, PFI will keep these producers informed.

NATURAL, ORGANIC, AND LITE BEEF PRODUCER QUESTIONNAIRE

1. If you have a cow-calf operation, how many calves do you annually produce? _____
2. What are the approximate calving dates? _____
3. What is the approximate weight at weaning time? _____
4. Do you have the capabilities and interest to expand your cow herd? Yes _____ No _____
If yes, to what number? _____
5. Do you have the capability to change or split your calving season? Yes _____ No _____
If yes, to what dates would you change or split your calving season?

6. When do you market calves? (give approximate numbers or %): at weaning _____ at
slaughter _____ other _____
7. Are your cattle fed under conditions which qualify them as:
"natural" (drug- and hormone-free)? Yes _____ No _____
"lite" (lean)? Yes _____ No _____
"organic"? Yes _____ No _____
8. Do you buy cattle to feed to slaughter weight for natural or organic beef? Yes _____
No _____
If yes, approximately how many head per year? _____
9. What do you know about the producer of the cattle you buy? are they considered:
natural? Yes _____ No _____ Don't know _____;
organic? Yes _____ No _____ Don't know _____
10. Would your supplier be interested in producing cattle that would meet either of these
standards?
Natural Yes _____ No _____ Don't know _____
Organic Yes _____ No _____ Don't know _____
11. Would you be interested in sending your natural or organically produced cattle to a
feedlot to be finished under a retained ownership program? Yes _____ No _____
Or would you prefer to sell them to a feedlot for finishing? Yes _____ No _____
Or would you prefer to feed them on your own farm? Yes _____ No _____

12. Do you presently have a market for your: natural beef Yes _____ No _____; organic beef Yes _____ No _____; lite beef? Yes _____ No _____

13. Are you interested in working with a large group to develop a national market for specially produced beef? Yes _____ No _____

14. Are you currently producing cattle under a verification program? Yes _____ No _____
If so, what changes do you feel need to be made? _____

15. If you have any additional comments or suggestions regarding production of natural, organic or light beef for an organized marketing program, please use the following space for these comments. _____

PFI BEEF QUESTIONNAIRE

RR 1, BOX 16

KELLEY, IOWA

50134

SEPTEMBER FIELD DAYS
--CHILLY AND SUCCESSFUL

It was in the 50's and threatening rain for the Thompson Farm Field Days this year. Vultures circled over the wagons as if they expected a meal. They were cleaning up the afterbirths in the field where fall calving was going on.

Four hundred people braved the cold those two days. It was quite a media event, with two TV crews and a bunch of state-level office holders and university people making appearances. One piece of information which came out was that there will be an ISU experiment station devoted to "regenerative" farming.

Practical Farmers of Iowa had an information table in the machine shop. A lot of good conversation and a few new memberships resulted. What got the most interest by far was the bag of hairy vetch on the table. Some growers from Nebraska had brought it in with them. It was the price which caught everyone's attention. These farmers had paid \$0.28/lb. at the elevator! Now, we've since gotten it cleared up that this is the price the elevator sells the cleaned seed back to those who grow it. The price for everyone else, though, isn't bad--\$0.38/lb. If you'd like to drive out to Nebraska for a pickup load, this source was Reikofski Grain, Foster, Nebraska. Better phone ahead, as vetch is in short supply around the Midwest this fall.

The day before the Field Days, Practical Farmers and the Regenerative Ag Association co-sponsored a day-long workshop featuring Chuck Francis, a cropping systems specialist from Nebraska, and John Doran, a soil microbiologist from the same state. The workshop was attended by about 50 people from all over the nation and the world. Fresh perspectives

were represented which aren't often heard from here in Iowa. The discussion was lively, as you will learn in the following two articles.

PRACTICAL RESEARCH AND SYSTEMS
FOR MIDWEST FARMING
 by Chuck Francis

This talk really covered a lot of ground. By the end it was really a wide-ranging discussion, with Francis working as the herd dog. Here's a synopsis.

"Practical"=save money and improve farming
 "Research"=new and better information
 "Systems"=integrated processes, the whole ball of wax
 "Midwest Farming"=unique resources of our region

Take the subject of cropping practices. Some factors, like the weather, are beyond the control of the farmer. Yet many of these are under some control. The farmer can make the best use of rain and sunny days, for example. Under the direct control of the grower are such items as the choice of crops grown and fertilizer used.

The difference between success and failure here is information. On a given subject there will be both university and private sector recommendations to deal with, as well as the conflicting claims of small local businesses and international corporations. How does one decide what's real, what information is useful? Should you as a farmer keep all this decision-making ability or give it to someone else?

Dr. Francis used hybrid corn to illustrate the problem. A small, local seed company, he said is more likely to have a hybrid suited for the area nearby than is a large company which must produce a hybrid for the range of conditions across

the cornbelt. You also need to look beyond the yield claims: they can't be taken literally. Attributes such as standability, ear drop and cost can change the picture considerably.

The audience had plenty to contribute on this subject, too. Comments included the following: The farmer who feeds corn needs to think about nutrient content. There are protein differences among the hybrid numbers. How about nitrogen use efficiency? Breeders don't make their selections under input-efficient conditions. This would take five years of response trials, which is longer than many hybrids are on the market.

It was also pointed out that all the corn breeding money for the past forty years had gone into hybrids. Open-pollinated varieties have higher protein than hybrids and might reach equivalent yields if the same breeding effort were put into them. Francis, a plant breeder himself, responded that he is not one who believes open-pollinated corn could potentially equal hybrids in yield. He also pointed out that the cost of seed represented only 4-5% of the cost of production, making hybrid corn a bargain.

Coming back after lunch, Chuck Francis addressed briefly two topics: options in soil fertility and agricultural research. Again, the group had plenty to say.

Francis encourages farmers to develop their own fertilizer recommendations instead of depending on someone else or average rates for the area. Soil testing every three-to-five years is a cost-effective practice. The choice of a soil test laboratory is important. Results tend to be similar for most labs, but the recommendations they give based on those test results differ wildly. Get ahold of the Land Grant

university recommendations for your state and set the rates accordingly. If you're happy with a testing lab, stick with it; that way you are more likely to get consistent numbers year-to-year.

Only 30-40% of the nitrogen applied to corn gets into the grain, even less at higher N rates. So set realistic yield goals, based on a rolling five-year average for the field. Yield goals for Nebraska farmers average 35 bushels/acre over their actual yields. On the other hand, give yourself all the nitrogen credits you deserve, based on green and livestock manure. The simple act of rotation gives about a 10% yield advantage to corn and soybeans, and this is above and beyond any nitrogen effect.

The comment was made that leaf tissue analysis tells what the plant actually "sees" in terms of nutrients. Take 25-50 of the leaves just below and opposite to the ears at tasselling, dry them and mail them off. It's not cheap, about \$22 per sample unless you get into bulk rates. At the University of North Carolina the in-state price is only \$3. A tax on feed and fertilizer sales helps support the program.

People were still thinking about what John Doran had said about tillage destroying organic matter. The question was asked, "What about the tillage in a ridge-till system--is it good or bad?" Francis's Response was that it's better that the tillage be summertime cultivation--which will release nitrogen at a time when the crop can use it--than primary tillage which breaks down organic matter when there is no crop to utilize the nutrients released.

On the subject of agricultural research, Francis stated that agronomists and agricultural sciences have become increasingly specialized and removed from the

reality of farming. Just the opposite is actually needed, he said. Research should be a team effort involving multiple disciplines, including extension. Only then will science be equipped to study whole systems instead of single variables in isolation.

Farmer-conducted research comes the closest to looking at systems because by definition it deals with the many factors involved in real farming. On-farm research is usually very practical research because it is carried out to answer specific questions. It is also practical in that it's compatible with the usual farm machinery and the scale of the fields. "Garden plot" trials couldn't be farmed. Much more research is done on working farms than on experiment stations, since most farmers are testing out new ideas at any given time.

Where on-farm research frequently falls short is in its precision, but this doesn't have to be the case. Planning and a small additional effort can greatly increase the information yield from such trials. Farmers and scientists should be working together in on-farm investigations, from the first discussions about objectives to evaluation of results and dissemination of the conclusions.

"What about the state universities?" people wanted to know. "Where are the university people today?" In fact, there were extension representatives from Nebraska and Missouri at the workshop, but none from Iowa. The comment was made that peer pressure and the funding sources for agricultural research are keeping researchers and extensionist away from such meetings.

Someone from Indiana said that the Soil Conservation Service in that state has pushed alternative farming methods much better than

Extension has. Someone else insisted that direct citizen action can be very effective. Another person informed the group that Governor Bob Kerry of Nebraska is setting up a committee on alternative agriculture. The opinion was also voiced that legislators who could support alternatives in agriculture need to be identified. Those at the meeting felt there is a need to educate bankers and economists about input-efficient farming, as well as a need to educate general citizens about such issues as groundwater. Finally another participant reminded us to keep our goals in mind--the quality of life, a safe environment and a constructive rural-urban relationship. Chuck Francis couldn't have said it better.

THE EFFECTS OF AGRICULTURAL MANAGEMENT ON SOIL MICROBIAL LIFE

by John Doran

Dr. Doran began his session by acknowledging that in the past the field of soil microbiology often has been far removed from actual agricultural production. Actually, he said, nearly everything we do in farming affects in some way the microscopic life in the soil. Soil microbes, he suggested, are a bit like people: they want to survive; different ones do different things; and they live in a community.

When farmers first plowed up the prairie, they changed the living conditions within the soil and thus the community of soil microbes. Tillage aerated the soil, allowing microbes to gradually break down the organic matter built up over the years under the sod. At first, a lot of nitrogen was released to the crops. As the organic matter storehouse was depleted, though, levels of available nitrogen fell below the requirements of those crops.

Other problems accompanied these

changes. In the 1930's, as a consequence, great emphasis was placed upon soil conservation. At that time a number of methods were first developed -- stubble-mulch tillage, for instance -- that have evolved into today's conservation tillage technology. What kind of a table are we preparing for the soil microbes by leaving crop residues on the surface and not tilling the soil? And what does this mean for the crops?

Doran described a 5-year study conducted at seven locations around the Midwest for the purpose of comparing no-till and conventional-tillage crop production. The big differences between the two systems appeared in the top 3 inches of soil. In this depth fraction no-till had somewhat more aerobic (air-breathing) bacteria and a lot more anaerobic (non air-breathing) bacteria. More total bacteria because that's where the "food" (crop residue) is. More anaerobes because the soil, especially the surface soil, tends to be moister under the no-till residue than in the exposed, worked-up ground of conventional tillage. In a ridge system in which residues were allowed to collect in the middles, the soil there contained more than twice as many microorganisms as the soil in the ridges.

Comparing no-till and conventional-till in the top 3 inches of soil, no-till had on average 140% more organic carbon, 129% more available nitrogen, 134% more "potentially mineralizable" N, and 158% greater microbial biomass. Below the 3-inch depth, no-till was slightly less than conventional in all these categories.

In short, the soil under no-till: was cooler, wetter, and contained less available oxygen; the soil microorganisms and organic matter were concentrated near the surface; and there was greater potential for nitrification,

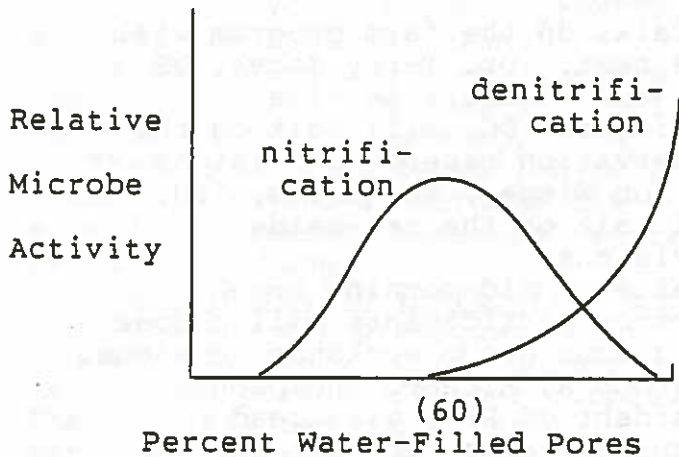
denitrification, and immobilization of nitrogen.

Free, dissolved nitrogen is "immobilized" when it is taken up by a microbe and turned into protein in the body of that microbe. The N has gone from a "mobile" form that could have been taken up by a plant root, to an immobile form -- microbial protoplasm. "Mineralization" is the opposite process, in which the cellular nitrogen is released back into the soil solution in a "mineral" form (ammonium or nitrate-N). Mineralization is encouraged when oxygen is introduced into the soil by the stirring action of tillage. In no-till, more nitrogen is immobilized and eventually finds its way into organic matter. After 10 years of the experiment, no-till had a higher organic matter content than conventional till. The "prairie storehouse" was being restocked, to a degree.

"But is this necessarily all good," wondered several members of the audience. "The new organic matter was created with nitrogen that would otherwise have been available to crops."

"Nitrification" is the conversion, by specialized soil bacteria, of ammonium nitrogen to nitrate nitrogen. Both forms are available to crops, but while ammonium is stable in the soil, nitrate-N can leach out of the root zone or be lost as nitrogen gas through the process of "denitrification." When the microbial community gets really short of free oxygen, many of its members will turn to the oxygen combined in nitrate, resulting in denitrification. This happens especially in waterlogged soils, but drier soils also contain a number of tiny, wet, oxygen-depleted sites. Nitrification, too, requires a certain amount of soil moisture. Nitrification rates

peak when about 60% of the pore spaces in the soil are filled with water. At greater soil moisture levels, nitrification drops off and denitrification becomes a problem. (See the graph.)



Since the soil under no-till tends to be wetter, there is more potential for denitrification. Nebraska is dry enough that the critical 60% level is not often reached, even under no-till. However, on poorly-drained soils in places such as north-central Iowa, greater denitrification does occur in no-till.

The five-year study found that wheat in no-till required 20-28 lbs./acre more nitrogen to obtain yields similar to those in conventional tillage. No-till corn needed 30-90 lbs. more to overcome the effects of cooler soil and nitrogen transformations. It is a good idea to place nitrogen fertilizer 3-4 inches deep in no-till fields. This gets the N below the most hectic microbial activity, so more fertilizer will actually get to the plant.

In conclusion, John Doran stated that we still have a long way to go in understanding these processes; yet we have the technology and, at present, the energy to affect the soil in ways whose consequences we

poorly comprehend.

Doran then fielded questions from the audience.

Q. What are the effects of agricultural chemicals on the microbial community?

A. Looking just at gross numbers of organisms, there may be some population decreases with herbicides. However, this might be due to the elimination of weeds, whose root exudates feed soil microbes. The rotational history of the land appears to be much more important to soil microbe populations than most pesticides.

Q. What are the effects of anhydrous ammonia on soil life?

A. Anhydrous injection affects about 10% of the soil volume in the plow layer. For larger soil organisms, such as earthworms, it is lethal within this zone. The soil immediately becomes alkaline in the area of injection, but over a period of weeks microbial nitrification of the ammonium gradually makes the soil somewhat acid. Doran was reluctant to say there is any long-term change in the soil life. He said he has seen land that appeared "different" from anhydrous treatment, but he wondered aloud what were the associated management practices. For example, the applicator might have been driven into the field when it was too wet for wheel traffic.

Q. What are the effects of management practices on soilborne plant pathogens?

A. It really depends on the disease and the location. Soil treated with manure is able to suppress some of the seedling root rots in some circumstances, for instance, but this is not well understood.

Q. Of what value are soil inoculants, say, in the reestablishment of healthy soil life in a field that has been abused?

A. In most cases the bugs will reestablish themselves given the right conditions, especially something to eat. Green- and livestock manures, crop residues and root systems give them this. If conditions aren't favorable, no amount of inoculation will help.

The comment was made by someone in the audience that research on topics like these needs to be done in the appropriate farming system. Even though science likes to take things apart and study them piece-by-piece, it is the system that makes the pieces work.

Dr. Doran, well acquainted with the complexity of the subject, was cautious about making sweeping statements. Still, he was able to clearly lay out the basics that farmers must have in order to "manage" soil microbes.

BIOFARMING WORKSHOP:
MANAGEMENT ALTERNATIVES
FOR BIOLOGICAL FARMING--III

The third Biological Farming Workshop will take place on February 5, 1987 at Iowa State University in Ames. By attending this workshop, we can all show our interest in and support for research at ISU on reducing costs to farmers and chemical inputs to agriculture.

The purpose of this workshop is "To convene farmers, managers, researchers, and conservationists interested in biological and low-input farming, and to share practical techniques." Part of the philosophy of PFI is that this sort of cooperation (through constructive questioning and positive suggestions) will lead to changes in agricultural research and practices much faster and with longer lasting results than would finger-pointing and trying to establish blame.

The presentations will begin with a welcome by Dr. John Mahlstedt, Associate Dean, College

of Agriculture and Associate Director, Agriculture and Home Economics Experiment Station, ISU. He is one of the persons fighting to keep at least the current level of funding for agricultural research despite state and federal cut-backs.

Talks on the farm program will come next. Dr. Terry Cacek, US Fish and Wildlife Service, Washington, DC, will talk on the conservation reserve provisions. Dr. Bob Wisner, Economics, ISU, will talk on the set-aside provisions.

After a mid-morning break, workshop participants will choose among four group workshop sessions. In group A, Richard Thompson, President of PFI, will lead discussion on government farm programs and low-input and biological farming. In group B, Bob Dayton, conservation agronomist, US Soil Conservation Service (USDA), Des Moines, will lead discussion on forage/livestock management schemes to improve production efficiency and benefit wildlife. In group C, Dr. Stewart Melvin, Agricultural Engineering, ISU, and Dr. Minoru Amemiya, Agronomy, ISU, will lead discussion on management effects on soil structure. In group D, Dr. Michael Duffy, Economics, ISU, will lead discussion on the economics of conversion to biological farming. These group workshop sessions will be a good place to share ideas and experiences and to learn from others.

The presentations after lunch will begin by considering water quality. Keith Bridson, Supervisor, Water Quality, Planning Section, Iowa Department of Natural Resources, Des Moines, will talk on surface water quality. Marion Conover, Fisheries Management Supervisor, Iowa Department of Natural Resources, Des Moines, will talk about impacts on aquatic

ecosystems.

After these talks, workshop participants will have the opportunity to attend another of the same four group workshop sessions offered in the morning.

After the mid-afternoon break, Dr. John Obrycki, Entomology, ISU, and Dr. Abe Epstein, Plant Pathology, Seed and Weed Sciences, ISU, will talk on biological tools for the future in farming.

Then, participants will have a chance to attend a third of the same four workshop sessions before leaving for home.

Preregistration is required and the deadline for preregistration is January 30, 1987. Conference fee is \$10 per person; \$15 per couple. The fee includes registration materials, breaks, and proceedings. A buffet lunch at \$5.50 per person will be available on site. You must preregister for lunch to be assured of seating. All sessions (and lunch) are in the Scheman Continuing Education Building, Iowa State Center, ISU, Ames.

To preregister, contact,
Pam Easterling
Office of Continuing Education
102 Scheman Building
Iowa State University
Ames, IA 50011
(515) 294-4731.

(Please mention the Biological Farming Workshop.)

For questions about program content or to order additional copies of the proceedings, contact:
Leader, Iowa CFWRU
9 Science II
Iowa State University
Ames, IA 50011
(515) 294-3159.

NOTES AND NOTICES

Fall is the season to renew your membership in Practical Farmers of Iowa. If you haven't done that yet, please remember that PFI needs you! Don't let this be your last issue of The Practical Farmer.

CORRESPONDENCE

Correspondence to the PFI addresses is always welcome.
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